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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,992	03/31/2004	Ruvin Deych	56229-153 (ANA-248)	8176

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EXAMINER	
HO, ALLEN C	

ART UNIT	PAPER NUMBER
2882	

MAIL DATE	DELIVERY MODE
12/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/814,992	DEYCH ET AL.	
	Examiner	Art Unit	
	Allen C. Ho	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,5,7-16,18 and 20-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *16,18 and 20-22* is/are allowed.

6)☒ Claim(s) *1, 4, 5, 7, 8* is/are rejected.

7)☒ Claim(s) *9-14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4, 5, 7, 8, and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Alving *et al.* (U. S. Patent No. 6,594,339 B1).

With regard to claim 1, Unger *et al.* disclosed a method for optimizing radiographic image quality of a single x-ray image of an object that is produced by irradiating the object with x-rays from an x-ray apparatus (**1**) during an initial period of an x-ray exposure, the x-ray apparatus including an x-ray source configured to generate x-rays directed toward and through the object, the x-ray source including an electron source (cathode) and an x-ray emissive target (anode) (column 6, lines 54-63), the method comprises:

A. determining a first operating voltage level kVp_0 of the x-ray source for initial operation of the x-ray apparatus (at the beginning of the x-ray exposure T_{exp}, column 8, lines 55-62);

B. during a first sampling interval Δt_1 (the first 0.1 ms in the course of the x-ray exposure) in the beginning of an x-ray exposure period (T_{exp}), operating the x-ray source at the first voltage level kVp_0 and using one or more sensors (**5**) to detect x-rays that have passed through a portion of the object during the interval Δt_1 (column 8, lines 63-67), wherein the first sampling interval Δt_1 (0.1 ms) is relatively small compared to the x-ray exposure period (the x-ray exposure period is 10 ms, column 8, lines 50-52), wherein the x-ray exposure period is a length of time during which the object must be irradiated with the x-rays in order for the single x-ray image of the object to be generated;

C. after the first sampling interval Δt_1, processing the output signals from the sensors to determine a second operating voltage level kVp_1 (column 8, lines 63-67, where the control signal cS is used to derive an x-ray control signal cX, column 6, lines 40-43, where the x-ray control signal cX is used to control the operating voltage of the x-ray apparatus, column 6, lines 56-63);

D. during a second sampling interval Δt_2 within the same x-ray exposure period, wherein the object is irradiated with x-rays from the x-ray apparatus during the x-ray exposure period to generate the single image of the object, operating the x-ray source at the second voltage level kVp_1 and using the sensors to detect x-rays that have passed through a portion of the object during the interval Δt_2 (0.2 ms from the beginning of the x-ray exposure period, column 8, lines 63-67), wherein the second sampling interval Δt_2 (0.1 ms) is also relatively small compared to the x-ray exposure period fro the single image of the object;

E. after the second sampling interval Δt_2, processing the sensor output signals to determine an optimal value kVp_2 for the operating voltage level, and setting the operating voltage level of the x-ray source of the x-ray apparatus to the optimal value kVp_2 for the remainder of the x-ray exposure period of the single image of the entire object.

With regard to claims 4 and 5, Alving disclosed a method in accordance with claim 1, the method further comprises: determining the optimal values of additional x-ray exposure parameters comprising x-ray tube current (column 6, lines 56-63).

With regard to claim 7, Alving *et al.* disclosed a method in accordance with claim 1, wherein the object comprises anatomical tissue of a patient, and wherein the optimal value of the operating voltage are chosen so that the patient's exposure is substantially minimized when the x-ray apparatus is operated at the optimal value (column 7, line 37 - column 8, line 15).

With regard to claim 8, Alving *et al.* disclosed a method in accordance with claim 1, wherein the x-ray imaging system comprises a flat panel detector (**20**).

With regard to claim 15, Alving *et al.* disclosed a method in accordance with claim 1, wherein steps B and C are repeated for a plurality of 99 sampling intervals Δt_1^1, ..., Δt_1^{99} (10ms/0.1ms -1, the last one being the remainder of the x-ray exposure period) during which the x-ray apparatus is operated at corresponding operating voltage levels kVp_1^1, ..., kVp_1^{99}, so that the optimal voltage level kVp_2 is determined based on sensor output signals generated while the x-ray apparatus was operated at voltage level kVp_1^{99} during a sampling interval Δt_1^{99} (column 8, lines 63-67).

Allowable Subject Matter

3. Claims 9-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. Claims 16, 18, and 20-22 are allowed.

5. The following is a statement of reasons for the indication of allowable subject matter:

With regard to claims 16, 18, and 20-22, the prior art disclose an x-ray imaging apparatus that comprises: an x-ray source including an electron source configured to emit electrons and an x-ray emissive target configured to emit x-rays from a focal spot within the target in response to incident electrons that have been accelerated from the electron source toward the target at an operating voltage of the x-ray source; an x-ray imaging system configured to receive x-rays that have been emitted from the x-ray source and that have passed through an object, and to generate an image of the object from the received x-rays; one or more sensors disposed between the object and the x-ray imaging system, the sensor being configured to detect x-rays from the x-ray source that have traversed the object; a processor configured to determine an operating voltage level of the x-ray source; and a controller configured to adjust the operating voltage of the x-ray source. However, the prior art fails to disclose a processor that is configured to determine a first operating voltage level kVp_0 of the x-ray source for an initial operation of the x-ray apparatus during a first sampling period Δt_1, the processor being further configured to calculate, after the first sampling period Δt_1, a second operating voltage level kVp_1 of the x-ray source by processing the output signals generated by the sensors during the first sampling period, the

processor being further configured to calculate, after the second sampling period Δt_2, an optimal operating voltage level kVp_2 of the x-ray source by processing the output signals generated by the sensors during the second sampling period as claimed.

Response to Amendment

6. Applicants' amendment filed 13 November 2007 with respect to claim 1 have been fully considered. The objection of claim 1 has been withdrawn.

7. Applicants' amendment filed 13 November 2007 with respect to claims 1, 4, 5, and 7-15 have been fully considered. The rejection of claims 1, 4, 5, and 7-15 has been withdrawn.

8. Applicant's arguments with respect to claims 1, 4, 5, and 7-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(1) Ganin *et al.* (U. S. Patent No. 6,459,765 B1) disclosed an automatic exposure control.

(2) Oikawa *et al.* (U. S. Patent No. 6,243,440 B1) disclosed a radiographic apparatus that monitors

(3) Granfors *et al.* (U. S. Patent No. 5,574,764) disclosed a digital brightness detector.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allen C. Ho/
Primary Examiner
Art Unit 2882

10 December 2007